

DEC 01 1989

UNDERGROUND TANK REMOVAL REPORT

FOR

**SCOTT PAPER COMPANY
CHESTER OPERATIONS
CHESTER, PENNSYLVANIA**

NOVEMBER 6, 1989

PRESENTED BY:

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EXECUTIVE SUMMARY

The work at the Scott Paper Company - Chester Operations consisted of three parts: 1) location and examination of underground storage tanks (USTs) on site, 2) removal of the UST's if necessary, 3) excavation of any contaminated soil from the UST openings. Included in this work was soil sampling 1) to prove that no contamination had taken place and 2) to give an estimation of the remediation work required by the recent PADER regulations where contamination is evident. Further required work will include remediation of the contaminated soil and groundwater remediation on site.

Eight underground storage tanks were located on the site. Seven of these tanks were found to have caused contamination in the areas due to holes in the tanks, spills and overfills. Excessive levels of petroleum hydrocarbons and xylene were found in all seven of the excavation areas. Other contaminants included; ethylbenzene found in six excavations, and toluene which was found in four of the excavation areas. The levels of ethylbenzene and toluene were considerably lower than those of xylene and the petroleum hydrocarbons. In all, an estimated one thousand two hundred ninety-five cubic yards (1,295 yds³) of contaminated soil was removed. This soil is being stored on site, on and covered with a plastic liner to prevent further contamination. The soil will be moved when remediation methods have been decided upon.

The removal of the UST's and excavation work was begun on August 14, 1989 by All-Services for Industry. All-Services removed five underground storage tanks and did the excavation in the area until September 15, 1989. On September 20, 1989 Truskey Mechanical Contractors with the help of Elderedge Environmental Services and Timothy Smith Excavating began removal of the remaining two tanks. The excavation work was completed on Saturday September 30, 1989 with the

removal of the last tank. I&S, Inc. cleaned the eighth tank found on site and did most of the backfill work over this time period. The locations of the underground storage tanks, the contents of the tanks and the tidal influence on the groundwater level made excavation of the tanks more difficult than originally expected. The removal of the tanks and contaminated soil was accomplished in accordance with PADER regulations. Substantial further efforts must be put into soil and groundwater remediation, the presence of which was confirmed by analyses conducted, for the greatest part, at Lancaster Laboratories, Inc.

INTRODUCTION

The Scott Paper Company plant in Chester, Pennsylvania was the site of a recent underground storage tank removal project. The Scott Paper Company plant is located on the banks of the Delaware River. Therefore, soil and groundwater pollution at the facility could have an impact upon the Delaware River and Bay and surrounding areas. The Scott Paper Company asked Buchart-Horn to help them in removal of their underground storage tanks, excavation of any contaminated soil from these tanks due to leaks or spills and in assessment of the levels of any contamination. The goal is to see that the sources of contamination of any soil and groundwater pollution are removed, and to remediate the site as required.

Eight underground storage tanks were on the Scott Paper Company, Chester Operations location. The presence of six of these were known although the location of one of the six was not known. Two of the tanks were discovered as a result of on-site investigation. Five of these tanks were removed from the area in front of the main entrance to the plant. One 550 gallon underground

abandoned gasoline tank was located in the middle of the paved yard area adjacent to the facility, and was removed. Another 550 gallon underground No. 2 Fuel oil tank as removed from the north face of the boiler-room building, located just south of the main office entrance to the facility. A 30,000 underground No. 6 fuel oil tank was also present under the boiler breaching outside the boiler room building. Because of the size location, complexity and danger associated with this tank, it was not removed.

The location of all of the tanks is noted on the attached map of the Chester operations.

Two Buchar-Horn representatives, David P. Cunningham, P.E. and Brad Striebig, were present during most of the removal project. Other representatives who were on site working on this project, in a more limited role, were Douglas Lorenzen and Wayne Downey. Work on site included observing the removal of the tanks, assessing the impact of unforeseen complications, taking the soil samples, using the HNu as a preliminary guide for soil removal, and consulting on the project.

No. 2 Fuel Oil Tank

The No. 2 Fuel Oil Tank was contracted to be removed because the tank was not properly protected with respect to the newly imposed state regulations. The No. 2 Fuel Oil Tank excavation began Monday, August 14, 1989 by All Services for Industry. The tank was not removed until Tuesday, as several pipes (one a ten inch water main) were discovered in the area of the tank excavation and extra caution was required to keep from damaging these and possibly other unknown pipes in the area. In addition, high pressure, high volume gas service to the boiler house was located in the immediate area of the excavation.

Further excavation of the surrounding soil was necessary due to extensive contamination from the leaking fuel oil tank. To remove the contaminated soil, a steel reinforced concrete ramp leading into a building had to be removed by two laborers using a jackhammer to break the ramp into removable pieces. A large portion of the contaminated soil was removed using All Service's backhoe. However the contamination extended under the water-main and toward the footer of the boiler building. This extended contamination had to be removed by hand in order to prevent damage to the piping. This process was slowed down due to the tidal influence which filled the excavation area twice a day with water. The excavation work was delayed for one week due to the tidal influence and until an effective plan could be developed. Removal of the contaminated soil was completed on August rental backhoe, 4 laborers, a dump truck and driver from Scott and various pieces of equipment of their own.

The maximum depth of the contamination was approximately seven or eight feet along the south and west end and approximately six feet along the north and east sides of the excavation. Wood from previous bulkheads and pilings lies along the west side and beside the concrete pad which was under the tank. The water main is located along the south side of the excavation. The high pressure natural gas distribution area is visible to the east of the excavation and a pipe with unknown contents runs along the north side of the No. 2 Fuel Oil Tank excavation site. Any further removal of soil was halted to keep from damaging the water and gas lines, the footing of the building, and creating severely unsafe working conditions.

The initial soil sample was taken to Lancaster Laboratories for analysis. This preliminary sample showed definite petroleum hydrocarbon contamination. Heavy petroleum hydrocarbon contamination was found through the 25 foot square

excavation area down to the concrete pad the No. 2 Fuel Oil Tank rested on. Trace amounts of m-xylene were also found in the composite sample of the removed soil. Approximately one hundred and thirty cubic yards (103 yds³) of soil were taken from the excavation area and moved onto plastic in the designated area of the coal yard.

Before the excavation was backfilled, a soil sample was taken from the side walls of the excavation. Analysis of this, the third sample, showed a considerable decrease in petroleum hydrocarbons and barely detectable levels of m-xylene. I&S, Inc. backfilled the excavation immediately after the last sample was taken to prevent the excavated hole from becoming a safety hazard to Scott Paper Co. employees. Remediation of the extracted soil and groundwater will begin when PADER approval is gained.

No. 6 Oil Tank

The No. 6 Oil Tank was emptied, examined and determined to excessively dangerous to remove with regard to the safety of the workers and the stability of the surrounding structures. The tank was carefully steam cleaned ensuring the removal of all products and materials. It is recommended that the tank remain in place. A remediation well may be installed through the tank after the tank was filled with sand or some other supporting material to prevent the tank from being a safety hazard. This tank, as well as all other tanks which were removed, is subject to tidal influence. With a capacity of 30,000 gallons, this tank was originally a rail tank car and was installed prior to the erection of the structures above it.

Fiberglass Xylene Tank

The Fiberglass Xylene Tank was examined and contracted for removal in accordance with newly passed state regulations. There was evidence that the tank had deteriorated and was leaking. All Services began the excavation process on Wednesday, August 16, 1989.

Removal of the soil covering the tank began Wednesday morning. Approximately nine thirty that morning (9:30 a.m.) the vacuum truck arrived and removed the contents of the tank (mostly xylene). This liquid was pumped into barrels which were to be removed by a solvent reclaimer. Shortly after removal of the tank's contents, the tidal level caused the groundwater to rise and begin to fill the tank up to about one third capacity. Samples of both liquid contents of the tank were taken to Lancaster Laboratories for analysis.

When the attempt to remove the tank in one piece failed (largely due to the amount of groundwater present) it was decided to remove the tank piece by piece. The tank was removed in pieces which were put into a dumpster by All Services using a backhoe, a dump truck, and an extra laborer on Tuesday, August 22, 1989. The delay in removal of the tank was caused by the groundwater situation, the possibility of finding unknown pipes in the area, and mechanical failures in the equipment used. Extreme care had to be taken to avoid damage to company property and to avoid jeopardizing personnel safety.

The liquid sample taken from the xylene tank contained petroleum hydrocarbons, xylene, and ethylbenzene. A composite soil sample taken as the soil was being removed was sent to Lancaster Laboratories for analysis. The analysis showed the soil contaminants to be the same compounds that were found as contents in the tank. Remediation based on results of these soil samples is being

investigated for the estimated 230 cubic yards of soil which was displaced to the coal yard. The soil in the immediate area is extremely unstable. Therefore, excavation area was backfilled shortly after the tank was removed to limit the safety problems the excavation hole posed to Scott Paper Co. workers and to the foundation of the adjacent building.

Waste Oil Tank

Signs of spills and leakage were evident upon examination of the waste oil tank, and for this reason it was slated for removal. The tank removal was contracted with All Services. The contents of the tank were emptied by a vacuum truck on Tuesday, August 29, 1989 and then the liquid was transported for disposal.

Thursday, August 31, 1989 excavation of the waste oil tank began. The concrete covering the tank was broken apart by two laborers using a jackhammer. The excavation of the tank was slowed due to the lack of proper equipment (which had to be rented or bought), limited knowledge of various pipes in the excavation area, and a very confined position that made the excavation more difficult.

On Friday, September 1, 1989, the waste oil tank was removed. Approximately 50 cubic yards of contaminated soil was dug out then transported to the coal yard and placed on plastic. Lancaster Laboratories received a composite sample of the soil which was removed. The analysis of the sample showed petroleum hydrocarbons to be the largest source of contamination. Xylene and ethylbenzene were also present in the soil. Recommended remedial procedures will be based on this analysis, and submitted to PADER for approval.

Mineral Oil Tank

Results from soil samples taken near the ends of the mineral oil tank showed signs of Toluene and Ethylbenzene contamination. These results were sufficient reason for removal of the UST in accordance with recent PADER regulations. Further examination near the fill line on top of the tank supported the laboratory results.

The Mineral Oil Tank excavation began the afternoon of Tuesday, September 5, 1989 with the removal of the concrete over the mineral oil tank. The concrete was broken apart by two laborers using a jackhammer and removed with a backhoe by All Services. The bolts used to secure the manway cover of the mineral oil tank were welded fast and had to be burned off to provide access to the inside of the tank. The tank was pumped out and cleaned with a vacuum truck and cleaner from Cambridge Chemical Cleaning of Linden, New Jersey on Friday, September 8. At that time approximately half the tank was dug out, and buoyancy forced the tank to rise as the groundwater level rose. However, the tank was too large to be removed with the backhoe, so a large trackhoe was subcontracted by All Services to lift the tank from the excavation hole.

At nine o'clock (9:00 a.m.) Monday, September 11, 1989 the mineral oil tank was removed. No further excavation was carried out since the groundwater was very high in the excavation and any further soil removal could have lead to instability of the surrounding structures. Samples were taken near the bottom of the excavation. Analysis of these samples by Lancaster Laboratories revealed petroleum hydrocarbon contamination and barely detectable levels of o-xylene and m-xylene. Approximately two hundred and forty-five cubic yards of ground were removed from the area of excavation. All Services used their dumptruck to transport this soil to an area covered by plastic in the coal yard.

The mineral oil tank was located under a walkway going to two of the building's emergency exits. To limit the time these exits had to be closed, the excavation was backfilled by I&S, Inc. Shortly thereafter another concrete walkway was constructed over the excavation area to facilitate personnel safety while other tanks were being excavated.

Kerosene Tank

The Kerosene tank had to be removed because it had been improperly closed many years ago and there was evidence of soil contamination. Cambridge Chemical Cleaning, a subcontractor to All Services, removed the tank and its contents.

Excavation of the Kerosene tank began late the morning of Monday, September 11, 1989. Removal of the manway revealed the upper ten inches of the tank to contain free-standing water, and the rest of the tank to be full of sand. The top of the kerosene tank was cut off Tuesday morning by two Cambridge laborers using cold-cutting equipment. This was done to allow the sand inside of the tank to be removed and relocated on plastic in the staging area. Samples of the sand and water were taken to Lancaster Laboratories for analysis. Thursday morning the kerosene tank was removed.

Removal of the contaminated soil from the kerosene tank continued into Thursday evening. Samples of the soil were taken from the excavation area and delivered to Lancaster Laboratories. Remediation of the excavation area will include decontamination of the soil based on the analytical results obtained from the soil samples. The results show that the two hundred sixty cubic yards (200 yds³) of soil removed from the kerosene tank are heavy contaminated with petroleum hydrocarbons and xylene. Measurable quantities of Toluene and Ethylbenzene were also detected by the lab. The sand contained within the

kerosene tank, approximately 75 cubic yards, was kept separate from the surrounding soil. Analysis of the sand has shown relatively low-levels of contamination from petroleum hydrocarbons and m-xylene. The remaining liquid and soil in the excavation area showed signs of petroleum hydrocarbon, xylene and ethylbenzene contamination in analytical analysis. However the concentration of the contamination was greatly reduced. The free-standing water within the tank was pumped into barrels via a Cambridge vacuum truck and stored on site until its status could be resolved. The sample from this liquid showed relatively low-levels of petroleum hydrocarbon contamination. The soil surrounding the tank was excavated until clean conditions were encountered. Great care was required in excavating the soil because there were high pressure fire water lines in the immediate area. Remedial methods for the soil and water from the excavation are being investigated.

Second Xylene Tank

The location of the second xylene tank and the probability that xylene still remained within the tank made removal of the tank necessary.

The second xylene tank was discovered outside the Scott Paper safety office after removal of a plug in what was a "possible fill-pipe". A large amount of xylene liquid was discovered and a sample of this liquid was taken to Lancaster Laboratories for analysis. Shortly thereafter, plans were made to remove the contents of the tank with a vacuum truck subcontracted through All Services and to begin excavation of the tank.

Work on the excavation of the second xylene tank commenced Monday, morning August 28, 1989. Approximately 100 gallons of liquid was pumped out of the xylene tank and into barrels to be stored on site pending resolution of its

disposition. It was discovered at that time the tank was approximately two thirds full of sand. The sand in the tank prevented access to other areas of the tank and removal of any other liquid product that may have been trapped elsewhere inside the tank. Difficulties while digging were also encountered. Problems with a high pressure gas line crossing the tank were discovered immediately, and contaminated soil was discovered at a very shallow depth. Explosive concentrations of xylene vapor were found within the tank and holes were discovered in several places along its sides. Access to the xylene tank was hindered by the stairs leading to the main entrance to the plant. Because the location of the tank was in a heavy traffic area, safety was of the utmost importance. Due to these factors, work on the tank was halted on Wednesday, September 6, 1989, a new proposal was drawn, and the job was recontracted.

Two weeks later (Thursday, September 21) Truskey Mechanical Contractors began clearing off and air-drilling the top of the No. 2 xylene tank to determine the thickness of the tank's material. Friday morning after extensive discussions and resolution of concerns, Elderedge Environmental Services began introducing liquid nitrogen into the tank. Introducing a continuous flow of liquid nitrogen into the tank accomplished two purposes. First, it chilled the contents to the point that the solvent vapor pressure dropped to near zero. Second, the evaporating nitrogen displaced the oxygen in the tank. With no solvent vapor pressure and no oxygen an explosion is not possible. Elderedge then had one man check the explosive level before proceeding to burn open the top off the tank while 3 other Elderedge employees monitored explosive level, oxygen level of the S.C.B.A., the liquid nitrogen flow and carbon dioxide blanketing gas. After segments in the top had been cut on three sides, the Elderedge subcontractor, Timothy Smith, began removing the sand inside the tank. Removal of the sand was hindered by the water-xylene liquid mixture in

the tank and explosive levels of gas from the xylene which was thawing. The sand was transferred directly into lined Elderedge' containers.

After the sand was removed from inside the tank, Timothy Smith continued to excavate the sides of the tank. Elderedge's vacuum truck arrived to remove the remaining contents of the tank and Truskey mechanical's subcontractor crane arrived to remove the tank from the excavation. The cables connecting the cranes boom and the second xylene tank broke twice during the removal process. Small amounts of sand and liquid remaining in the tank, the gas line running over the tank, and rising groundwater caused the greatest difficulties while removing the tank. The removal of the tank and surrounding soil was completed Thursday, September 28. The soil which was withdrawn from the excavation was sampled and transferred to a dumptruck and deposited in the coal yard on plastic to prevent spread of contamination from run-off. The excavation was immediately backfilled to allow for safe use of the main entrance to the building.

Remediation of the excavated soil and groundwater in the area will be based upon the analytical results of the samples. Petroleum hydrocarbons, xylene and ethylbenzene were the contaminants which the analysis showed were present in the greatest concentration of the liquid, sand, and composite soil sample. Measurable toluene levels were found but in smaller concentration than the other contaminants in the excavated soil. Approximately two hundred and thirty cubic yards of soil must be decontaminated.

Gasoline Tank

Soil samples were taken with a hand auger on either side of the underground gasoline tank. The analysis reported by Lancaster Laboratories showed the

presence of petroleum hydrocarbons, toluene, xylene and ethylbenzene. The concentrations found in the analysis indicated the tank would have to be removed to comply with PADER regulations.

On Saturday, September 29, 1989, the gasoline tank was removed along with the contaminated soil in the surrounding area. A hydraulic crane and a backhoe with labor support were used to effect the removal.

Three soil samples were taken to determine what type of remediation would be best to comply with PADER regulations. The internal sand of the gasoline tank showed very low levels of petroleum hydrocarbons. The contaminated composite showed higher levels of petroleum hydrocarbons, xylene, and ethylbenzene in the excavated soil for which the best remedial method is being examined. The walls of the excavation show that removal of the contaminate soil was successful and the contamination was confined to the estimated seventy-five cubic yards of soil that had been removed. Only very small levels of petroleum hydrocarbons were detected in the edges of the excavation pit.

LIQUID AND SOIL SAMPLES
SCOTT PAPER CO. CHESTER OPERATIONS
TABLE NO. 1

<u>TANK</u>	<u>SAMPLE</u>	<u>ANALYSIS</u>	<u>RESULTS DRY WT. BASIS</u>	<u>UNITS</u>
No. 2 Fuel Oil	I (soil)	Petroleum Hydrocarbons	490	mg/kg
	II (soil)	Petroleum Hydrocarbons	3,100	mg/kg
		m-Xylene	90	ug/kg
	III (soil)	Petroleum Hydrocarbons	880	mg/kg
		m-Xylene	30	ug/kg
Fiberglass Xylene	I (liquid)	Petroleum Hydrocarbons	1,300	mg/kg
		Total Xylene	150,000	ug/kg
		Ethylbenzene	18,000	ug/kg
	II (soil)	Petroleum Hydrocarbons	1,200	mg/kg
		Total Xylene	15,000	ug/kg
		Ethylbenzene	2,000	ug/kg
Waste Oil	I (liquid)	Total Organic Halogens	81.4	mg/kg
	II (liquid)	Petroleum Hydrocarbons	63	% by
	III (soil)	Petroleum Hydrocarbons	4,600	mg/kg
		Total Xylenes	430	ug/kg
		Ethylbenzene	90	ug/kg
Mineral Oil	I (soil)	Modified Purgeables (soil)	14,000	ug/kg
		Toluene		
		Ethylbenzene	8,800	ug/kg
	II (liquid)	Metals and Base Neutrals	none detected	
	III (soil)	Petroleum Hydrocarbons	50	mg/kg
		o-Xylene	30	ug/kg
		m-Xylene	30	ug/kg

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SCOTT PAPER CO. CHESTER OPERATIONS
TABLE NO. 1

<u>TANK</u>	<u>SAMPLE</u>	<u>ANALYSIS</u>	<u>RESULTS</u> <u>DRY WT. BASIS</u>	<u>UNITS</u>
Kerosene	I (soil)	Petroleum Hydrocarbons	150	mg/kg
		Total Xylene	2,450	ug/kg
		Ethylbenzene	270	ug/kg
	II (liquid)	Petroleum Hydrocarbons	5.7	mg/l
	III (liquid-x)	Petroleum Hydrocarbons	4,200	mg/l
		Total Xylenes	1,950	ug/l
		Ethylbenzene	10	ug/l
	IV (clean soil)	Petroleum Hydrocarbons	90	mg/kg
		Total Xylene	290	ug/kg
		Ethylbenzene	40	ug/kg
	V (sand)	Petroleum Hydrocarbons	80	mg/kg
		m-Xylene	40	ug/kg
	VI (soil composite)	Petroleum Hydrocarbons	960	mg/kg
		Toluene	400	ug/kg
Total Xylene		421,000	ug/kg	
Ethylbenzene		42,000	ug/kg	
Secondary Xylene	I (liquid)	Toluene	0.87	% by
		Total Xylene	69	% by
		Ethylbenzene	20	% by
	II (sand)	Petroleum Hydrocarbons	70	mg/kg
		Total Xylene	1,750,000	> PPB ug/kg
		Ethylbenzene	350,000	ug/kg

LIQUID AND SOIL SAMPLES
SCOTT PAPER CO. CHESTER OPERATIONS
TABLE NO. 1

<u>TANK</u>	<u>SAMPLE</u>	<u>ANALYSIS</u>	<u>RESULTS DRY WT. BASIS</u>	<u>UNITS</u>
Gasoline	III (soil)	Petroleum Hydrocarbons	620	mg/kg
		Toluene	400	ug/kg
		Total Xylene	450,000	ug/kg
		Ethylbenzene	112,000	ug/kg
	I (soil)	Petroleum Hydrocarbons	380	mg/kg
		Toluene	70	ug/kg
		Total Xylene	230	ug/kg
		Ethylbenzene	50	ug/kg
	II (sand)	Petroleum Hydrocarbons	40	mg/kg
	III (soil composite)	Petroleum Hydrocarbons	430	mg/kg
		Total Xylene	100	ug/kg
		Ethylbenzene	30	ug/kg
BACKGROUND SOIL	IV (side wall soil)	Petroleum Hydrocarbons	80	mg/kg
		Petroleum Hydrocarbons	410	mg/kg

**ESTIMATED CUBIC YARDS OF CONTAMINATED SOIL
SCOTT PAPER CO.-CHESTER OPERATIONS
TABLE NO. 2**

From: No. 2 Fuel Oil Excavation	130 yd ³
No. 1 Fiberglass Xylene Excavation	230 yd ³
Waste Oil Excavation	50 yd ³
Mineral Oil Excavation	245 yd ³
Kerosene Sand	75 yd ³
Kerosene Excavation	260 yd ³
No. 2 Xylene Excavation	230 yd ³
Gasoline Excavation	<u>75 yd³</u>
Total	1295 yd ³